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(editors):

Relational Methods in Computer Science

Dagstuhl-Seminar-Report; 80
17.01.-21.01.94 (9403)

SEMINAR-REPORT

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Interpreting the operations of linear logic constructively in Chu(K) yields a calculus CLL that closely parallels that of RA. CLL differs from RA in the following essential ways.

1. Constructive. Entailments $R \vdash S$ are truth-valued in RA (0 or 1), set-valued in CLL (the set of proofs or moves from R to S).

2. Contravariant. All relations go from a covariant set A to a contravariant set X, in the sense that a morphism from R to R' consists of two maps $f : A \longrightarrow A', g : X' \longrightarrow X$, satisfying $f(a)R'x = aRg(x)$. The effect is to make converse (transpose) play the role that complement-of-converse plays for RA.

3. Concurrent. RA's sequential (noncommutative) composition is replaced by parallel (commutative) interaction or orthocurrence, as with the structure of the six events when a sequence of three trains passes through a sequence of two stations.

4. Concrete. In CLL the row index set of R is treated as its underlying set, obtained as $!R$. RA relations have no corresponding uniform notion of underlying set.

This organization works for relations whose truth values come from any fixed set K, not just 2. When $K = 2^n$, this category realizes (fully and concretely embeds) the category Str_n of n-ary relational structures and their homomorphisms. In turn all major categories of mathematics embed in Str_n for some (typically small) n, e.g. n=3 for groups and semigroups, 4 for monoids, etc., making Chu(2^n) a universal self-dual category for everyday mathematics.

Zooming In. Zooming Out.

Maarten de Rijke[8]

In the talk I draw attention to a phenomenon that seems to be appearing in many research areas nowadays: the phenomenon of *combined ontologies*. This term is used to refer to ontologies that consist of multiple component structures together with links between them. Examples and applications of combined ontologies can be found in the semantics of object oriented programming, verification of real-time systems, temporal databases, generative linguistics, the semantics of natural languages, and in many other fields.

The talk presents examples of combined ontologies, it mentions some of the logical issues they give rise to, and it concludes with some problems.

[8]Joint work with P. Blackburn